

based on purely natural causes, has as yet been suggested to account for the changes observed on Mars.

It is not considered by the writer, however, that any of these hypotheses are sufficiently well supported as yet to justify us in such a momentous conclusion as the decision that intelligent animal life now exists upon Mars. To the majority of scientific men, probably nothing short of the reception of a series of intelligible signals would be considered sufficient evidence to lead to such a decision. These theories of the canals are mentioned here, not because the writer feels assured that any one of them is right, but simply because (b) and (c), at least seem to him to account for the observed facts more readily than any of the others, and because he feels that any theory, even a false one, is better than none at all. To the direct question so often asked, however, "Is Mars inhabited by intelligent beings?" we must, and probably long shall be obliged to reply simply, possible, but not proven.

DOES THE DARKEST HOUR COME JUST BEFORE DAWN?

This popular saying is frequently supposed to be poetical rather than meteorological. The well-known observer of meteors, Mr. W. F. Denning of Liverpool, in a note to The Observatory, as quoted in the Journal of the Royal Astronomical Society of Canada,¹ states that his own experience would confirm the truth of this proverb, and we quote his statement in full in the hope that American observers may throw light on the problem.

The darkest hour precedes the dawn.—I have occasionally seen inquiries as to the truth of this expression, but can not remember to have read any discussion or explanation of the subject.

Having been out observing on thousands of nights, and often enough "until the dappled dawn" rose, I may, perhaps, be allowed to give an opinion on the matter—and it is certainly in favor of the view stated in the heading to this note. I have frequently been impressed with the intense darkness which comes on before dawn. When a person has been out all night his eye naturally becomes accustomed to the prevailing conditions; he can discern things with astonishing distinctness and is familiar with such objects around as are within his range of vision.

Before dawn a greater darkness seems to drop down like a mantle upon the immediate surroundings. Objects which were plainly observable during the previous hours of the night are blotted out, and a nervous feeling is sometimes induced by the dense opacity of the air. I think the unusual darkness only lasts a short time, and that a quick brightening succeeds, but its occurrence is most marked and by no means a rare experience. I have noticed it independently of any previous knowledge, and when such a thing has been far from my thoughts, so it can not have been a subjective sensation. But I have been out only on clear, starry nights.

I regret that I have recorded no observations in detail, and so can not say the exact interval before sunrise when the remarkable darkness came on, and whether it is common to every night and season and condition of sky. But of its frequent manifestation I can speak with confidence, and possibly there may be some simple explanation of the event, though it does not occur to me at the moment.

NOTES ON BALLOON OBSERVATIONS AND ON WATER- SPOUTS FROM THE VOYAGE OF LA PÉROUSE.

In the MONTHLY WEATHER REVIEW for October, 1898, 26: 461-463, we have published all known references to the use of the kite, but Dr. Otto Klotz has sent us from Ottawa a note that is worth repeating from the original French text.

In the original Paris edition,² "Voyage de la Pérouse au Tour du Monde," v. 1, Paris, 1797, there have been collected in four quarto volumes all that pertains to the unfortunate expedition which started June, 1785, and was destroyed by a hurricane in 1788 among the islands northwest of Australia.

These four volumes embrace the personnel of those under La Pérouse, also the detailed orders of the King, Louis XVI, relative to the route of the expedition. Among the special observations relative to navigation those relating to the magnetic needle were prominent. Beginning with volume 1, page 156, of the quarto French edition of 1797 (or p. 222 of the octavo English edition of 1798) are given in detail the scientific objects suggested by the Académie des Sciences, as communicated by its eminent permanent secretary, De Condorcet, who was born in 1742 and died in 1794, a sacrifice to the troubles of that year.

Among the apparatus of the scientific outfit we note (p. 249, 1797 edition): "One large balloon of toile [either linen or cotton cloth] with an inner lining of thin paper (papier Joseph), 26 feet high and 22½ feet in diameter; also three balloons of paper and three of goldbeaters' skin." This outfit having been provided in 1785 seems to have contemplated the use of hydrogen gas, which was advocated for aeronautic use by the Paris Academy of Sciences in 1783, as being better than the Montgolfier [method], although the popularity of the latter had captivated the attention of all the world.

We translate as follows (p. 162, French edition; p. 122, English edition of 1799) from the suggestions by the Academy of Sciences:

The academy on learning that the navigators are carrying with them a certain number of small aerostatic balloons invites them to make use of these in order to determine the altitude at which the winds that blow in the lower part of the atmosphere change their direction and also the course of these directions. These observations are especially important in localities where the trade wind prevails, where it will be desirable to know its relation with the winds of the upper region of the atmosphere * * *.

On page 163, we read:

There is no agreement as to the cause that produces waterspouts (trombes) or tornadoes; some attribute them to electricity; others consider them as the effect of a turbination (twisting ascent) contracted by a mass of air.*

Navigators should be very attentive to observations of all the circumstances that conduce to the explanation of this mysterious phenomenon.

* In this latter hypothesis the centrifugal force of molecules of air forced from the axis of rotation should diminish the pressure of those that are located near the axis, forcing them to relinquish the water they hold in solution and to give rise to a cloud whose form will be very nearly that of a solid of revolution and whose little drops will soon disperse as the effect of centrifugal force. The pressure of atmospheric air not being diminished in the direction of the axis of rotation, the air should perpetually renew itself, entering at the two extremities of the axis and by the diminution of pressure maintain in the interior a continuous precipitation of water that will endure as long as the turbinate movement continues and whose abundance will depend on the velocity of that movement and of the mass of air it affects.

This theory of the form and action of waterspouts is in many of its details so far in advance of anything that had been advocated by Andoque (1727); Franklin (1753); Cotte (1774), and others of that time, that we may properly attribute it to the distinguished permanent secretary of the Academy, Condorcet, whose thorough familiarity with the laws of mechanics expounded by Euler and whose remarkable insight into every branch of natural philosophy seems to warrant and justify our conclusion. Had not d'Alembert died in October, 1783, we should have thought this lucid explanation might have emanated from that distinguished philosopher. Doubtless the mechanics of tornadoes as we now understand it had been most carefully discussed by those eminent members of the Academy of Sciences, Condorcet, d'Alembert, La Place, and Benjamin Franklin who frequently attended its meetings during the years 1776-1785.—[C. A.]

¹ Toronto, July-August, 1914, 8: 294-295.

² Published in accordance with the decree of Apr. 22, 1791, and edited by L. A. Millet-Mureau.